1W Isolated DC to DC Converters - Single Output

multicompPRO

1W, Fixed input voltage, isolated & unregulated single output

RoHS Compliant

Features

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 85%
- Isolation voltage:1.5K VDC/min, 3K VDC/1s
- International standard pin-out
- Compact SIP package
- IEC62368, UL62368, EN62368 approved

Continuous Short Circuit Protection

These series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Selection Guide

Part Number	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(µF)* Max.
	Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
MPB0503S-1W	5 (4.5 to 5.5)	3.3	303/30	70/74	2400
MPB0505S-1W		5	200/20	78/82	2400
MPB0509S-1W		9	111/12	79/83	1000
MPB0512S-1W		12	84/9	79/83	560
MPB0515S-1W		15	67/7	79/83	560
MPB0524S-1W		24	42/4	81/85	220

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC/5VDC output	-	270/5	286/10	mA
	9VDC/12VDC output	-	241/12	254/20	
	15VDC/24VDC output	-	241/18	254/30	
Reflected Ripple Current*		-	15	-	
Surge Voltage(1sec. max.)		-0.7	-	9	V DC
Input Filter	Capacitance filter				
Hot Plug	Unavailable				
Note: * Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.					

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Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output		-	1.5	-
		Other output		-	1.2	
Load Regulation	10% -100% load	3.3VDC output	-	15	20	%
		5VDC output		10	15	
		9VDC output		8	10	
		12VDC output		7	10	
		15VDC output		6	10	
		24VDC output		5	10	
Ripple & Noise*	20MHz bandwidth	Other output		30	75	mVp-p
		24VDC output		50	100	
Temperature Drift Coefficient	100% load			±0.02	-	%/°C
Output Short Circuit Protection			Continuous, self-recovery			

Note: *Ripple and noise tested with "parallel cable" method, please see DC-DC Converter Application Notes for specific operation methods.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		1500	-	-	VDC
	Input-output, with the test time of 1 second and the leak current lower than 1mA		3000	-	-	
Insulation Resistance	Input-output resistance at 500VDC		1000	-	-	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V		-	20	-	pF
Operating Temperature	Derating if the temperature ≥85°C, (see Fig. 2)		-40	-	105	°C
Storage Temperature			-55	-	125	
Casing Temperature Rise	Ta=25°C	3.3VDC output	-	25	-	
		Other output	-	15		
Pin Soldering Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds		-	-	300	
Storage Humidity	Non-condensing		-	-	95	%RH
Switching Frequency	100% load, nominal input voltage		-	270	-	kHz
MTBF	MIL-HDBK-217F@25°C		3500	-	-	k hours

Physical Specifications

Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Package Dimensions	11.6*6.*10.16mm
Weight	1.3g(Typ.)
Cooling Method	Free air convection

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EMC Specifications

| EMI	CE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±4kV perf. Criteria B

Product Characteristic Curve

3.3VDC output
Tolerance Envelope Curve

Other output
Tolerance Envelope Curve

Fig. 1

Temperature Derating Curve

Fig. 2

Efficiency Vs Input Voltage (Full Load)

MPB0505S-1W

Efficiency Vs Output Load(Vin=5V)

MPB0505S-1W

Efficiency Vs Input Voltage (Full Load)

MPB0515S-1W

Efficiency Vs Output Load(Vin=5V)

MPB0515S-1W

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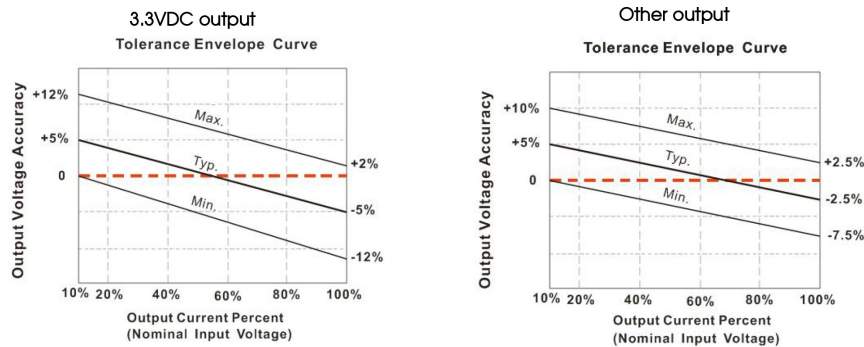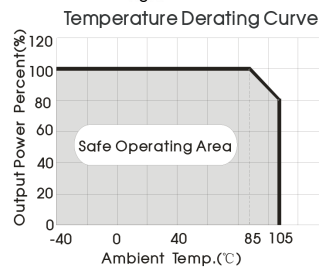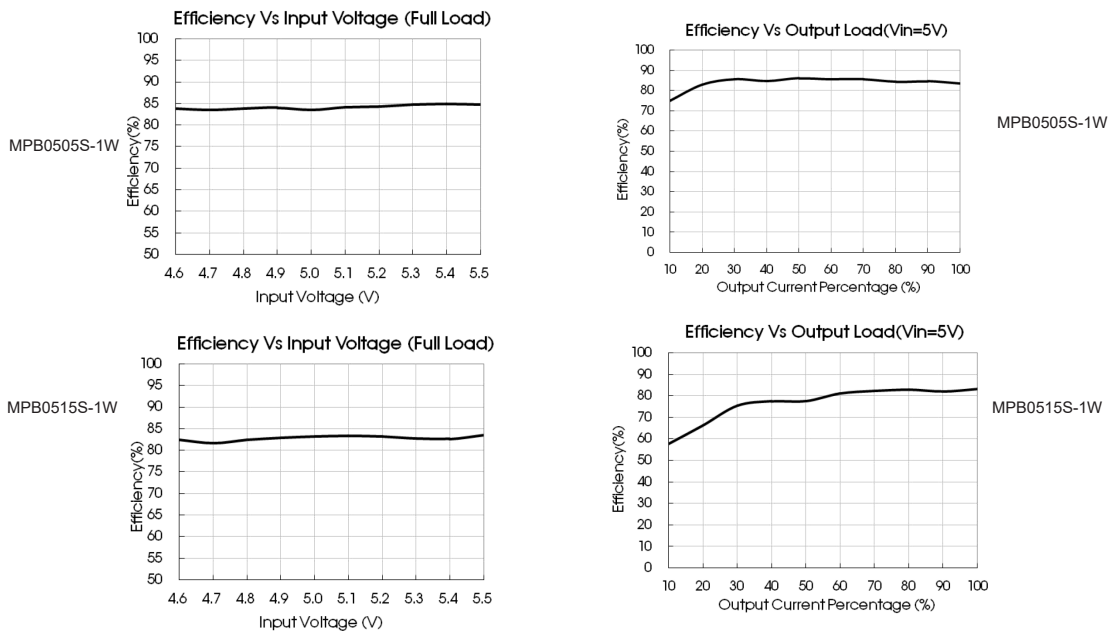
Design Reference

Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3.

Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

Fig.3

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (µF)	Vout (VDC)	Cout (µF)
5	4.7	3.3/5	10
-	-	9/12	2.2
-	-	15/24	1

2.EMC solution-recommended circuit
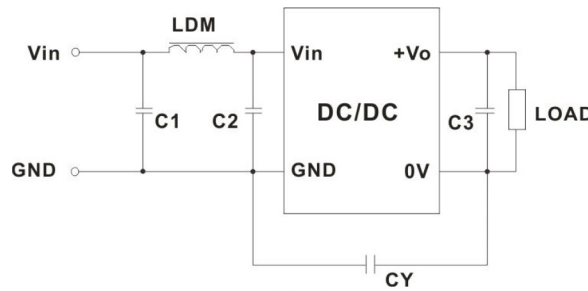
Fig. 4

EMC recommended circuit value table (Table 2)

		Output voltage (VDC)	3.3/5/9	12/15/24
Input voltage 5VDC	EMI	C1/C2	4.7µF /25V	4.7µF /25V
		CY	-	1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
		C3	Refer to the Cout in table 1	
		LDM	6.8µH	6.8µH

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Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

Note : Grid 2.54*2.54mm

Front View

Bottom View

0.50 [0.020]

10.16 [0.400]

4.10 [0.161]

1.99±0.50 [0.078±0.020]

2.54 [0.100]

7.62 [0.300]

0.50 [0.020]

0.90 [0.035]

0.30 [0.012]

6.00 [0.236]

11.60 [0.457]

⌀1.00 [⌀0.039]
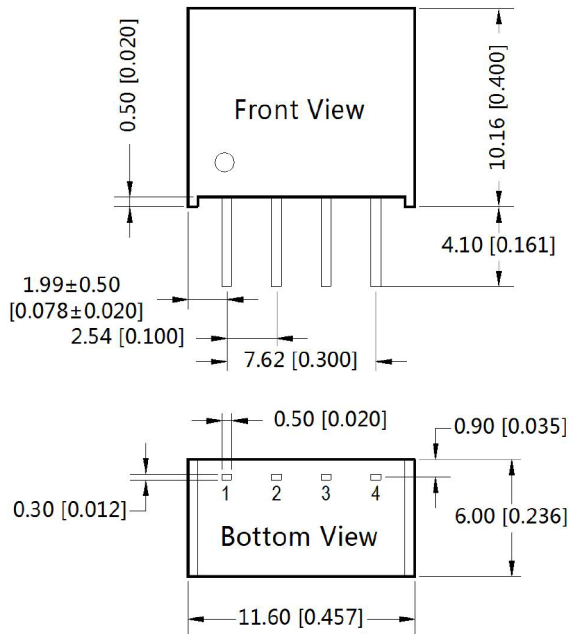
Note:
Unit :mm[inch]
Pin section tolerances :±0.10[±0.004]
General tolerances:±0.25[±0.010]
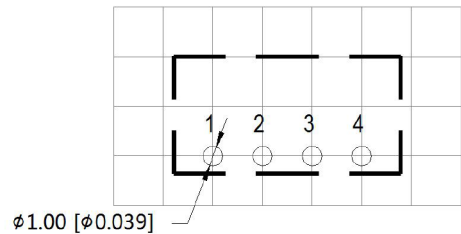
Pin-Out	
Pin	Function
1	GND
2	Vin
3	0V
4	+Vo

Notes:
1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C , humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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